



Course Specification

(Bachelor)

Course Title: Cloud Computing for AI

Course Code: AI4308

Program: Bachelor of Science in Artificial Intelligence

Department: Computer Science and Artificial Intelligence

College: Computing

Institution: Umm Al-Qura University

Version: 1

Last Revision Date: 3 January 2025

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A. General information about the course:

1. Course Identification

1. Credit hours: (3)

2. Course type

A. ☐ University ☐ College ☒ Department ☐ Track ☐ Others
B. ☐ Required ☒ Elective

3. Level/year at which this course is offered: (Level 8/4th year)

4. Course General Description:

This course introduces students to the fundamentals of cloud computing and its integration with artificial intelligence (AI). It covers cloud architecture, deployment strategies, and various services offered by platforms like AWS, Microsoft Azure, and Google Cloud. Students will learn to utilize cloud platforms for AI applications, explore AI as a Service (AlaaS), and develop scalable, efficient AI systems using cloud technologies. Practical sessions will focus on designing and deploying AI systems in the cloud, leveraging cloud-based tools and services.

5. Pre-requirements for this course (if any):

CEN3011-Computer Networks

6. Co-requisites for this course (if any):

N/A

7. Course Main Objective(s):

The objectives of this course are to:

1. Understand the basics of cloud computing, including architecture, layers, and deployment models.
2. Analyze cloud service types (IaaS, PaaS, SaaS) and how they support AI applications.
3. Explore AI as a Service (AlaaS) and its applications in industry.
4. Utilize cloud platforms (e.g., AWS, Azure, Google Cloud) to build and deploy AI models.
5. Empower students to Design and deploy scalable AI solutions in cloud environments, focusing on real-world applications.

2. Teaching mode (mark all that apply)



No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	45	100
2	E-learning		
3	Hybrid - Traditional classroom - E-learning		
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	45
2.	Laboratory/Studio	
3.	Field	
4.	Tutorial	
5.	Others (specify)	
Total		45

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	Identify the principles of cloud computing and its relevance to AI applications.	K1	Lectures, discussions	Exams
1.2	Explain AI as a Service and its benefits in modern AI solutions.	K2	Lectures, discussions	Exams
2.0	Skills			
2.1	Analyze cloud platforms and their services to select	S1	Lectures, discussions	Exams, assignments, Project





Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
	suitable solutions for AI applications			
2.2	Design and deploy scalable AI models using cloud platforms like AWS, Azure, and Google Cloud.	S2	Lectures, discussions	Exams, assignments, Project
2.3	Evaluate the performance, scalability, and cost-efficiency of cloud-based AI solutions.	S2	Project mentorship, discussions	
3.0	Values, autonomy, and responsibility			
3.1	Demonstrate ethical responsibility in managing cloud-based AI systems, including data privacy and security considerations.	V1	Lectures, discussions	Assignments, Project
3.2	Exhibit autonomy in managing projects that integrate AI and cloud technologies.	V2	Lectures, discussions	Assignments, Project
3.3				

C. Course Content

No	List of Topics	Contact Hours
1.	Introduction to cloud computing: Basics, layers, and deployment models	3
2.	Cloud architecture: Layers, components, and design principles	6
3.	Types of cloud services: IaaS, PaaS, SaaS, and their role in AI	6
4.	AI in cloud computing	6
5.	AI as a Service (AIaaS): Overview, tools, and applications	9
6.	Cloud platforms for AI: Overview of AWS, Azure, Google Cloud	9
7.	Challenges and future trends	6
8.		
Total		45



D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Programming assignments	1-12	20
2.	Quizzes	1-12	10
3.	Midterm	7	30
4.	Final Project	16	40

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Gupta D. <i>The Cloud Computing Journey: Design and Deploy Resilient and Secure Multi-Cloud Systems with Practical Guidance</i>. Packt Publishing; January 2024. Brown K, Woolf B, Yoder J. <i>Cloud Application Architecture Patterns: Designing, Building, and Modernizing for the Cloud</i>. O'Reilly Media, Inc.; May 2025.
Supportive References	Kavanagh K. <i>Google Machine Learning and Generative AI for Solutions Architects</i>. Packt Publishing; June 2024. Jay R. <i>Enterprise AI in the Cloud: A Practical Guide to Deploying End-to-End Machine Learning and ChatGPT Solutions</i>. Wiley; January 2024. Singh P, Karuparti A. <i>Generative AI for Cloud Solutions: Architect Modern AI LLMs in Secure, Scalable, and Ethical Cloud Environments</i>. Packt Publishing; April 2024. Pinto I, Santos P. <i>AWS Cloud Projects: Strengthen Your AWS Skills Through Practical Projects</i>. Packt Publishing; October 2024. Shanaghy É, Elger P. <i>AI as a Service: Serverless Machine Learning with AWS</i>. Manning Publications; September 2020.
Electronic Materials	
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classroom, computer laboratory
Technology equipment (projector, smart board, software)	Essential: data show, plagiarism detection software, Python, Jupiter notebook





Items	Resources
	Architecture modeling tools (e.g., Lucidchart, Draw.io, Hava.io, Cloudcraft, Microsoft Visio).
Other equipment (depending on the nature of the specialty)	

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students	Direct: Survey
Effectiveness of Students assessment	Peer-reviewer	Direct: Evaluating a random sample of the final exam
Quality of learning resources	Faculty	
The extent to which CLOs have been achieved	Faculty	Direct: Analysis of mappings of assessments and CLOs
Other		

Assessors (Students, Faculty, Program Leaders, Peer Reviewers, Others (specify))

Assessment Methods (Direct, Indirect)

G. Specification Approval

Council /Committee	COMPUTER SCIENCE AND ARTIFICIAL INTELLIGENCE DEPARTMENT COUNCIL
Reference No.	THE 16 TH MEETING FOR THE ACADEMIC YEAR 1446H
Date	22/04/2025

